What is claimed is:

1.A focus control method for Delta-Sigma based image formation devices wherein synchronizing a delay of two corresponding channels at both sides of a probe, and numeral value with the same absolute value but with a different sign being added to said corresponding channels so as to eliminate extra noise after the signals being summed up, and to control the delay change of said two channels with the same controller thereby saving 1/2 of said controllers, and performing dynamic control the aperture of the probe and eliminating noise during dynamic focusing so as to maintain a single bit output by this character thereby finally forming a beam signal required for an image by the Delta-Sigma based image formation device and maintaining quality of said image with compensation by summing up said added values.

2.The control method of claim 1, wherein said control method is applicable to all types of probes, wherein the equation for focusing is expressed:

$$t_{rx}(x_i, R, \theta) \approx \frac{x_i^2 \cos^2\theta}{2Rc} - \frac{x_i \sin\theta}{c},$$

wherein Xi is the distance from the i-th channel to the probe center, (R,θ) is the polar coordinate of a specified point in a sound field, c is the velocity of sound; the value of delay can be calculated from the system or by referring to a table, in the above equation, the first term represents focusing, the second term represent beam steering, the change of focusing item is only related to distance R.

3.The method of claim 1, wherein it is necessary to quantize a

delay in a digital system, assuming the sampling period is ts, and distance R is expressed by R-ncts/2, wherein n is a clock index, then a delay index is expressed:

$$k_n = round(\frac{x_i^2 \cos^2\theta}{nc^2 t_s^2} - \frac{x_i \sin\theta}{ct_s}).$$

when Kn+1=Kn-1, a new sample must be inserted whose value depends on the selection method.

4.The control method of claim 1, wherein during dynamic focusing, the steering term is never changed with the change of distance, but the focusing item decreases as the value of n increases, neglecting the effect of quantized delay and assuming the number of channels is N, the two corresponding channels i and N-i+1 at both sides of the probe have similar focusing term, but the synchronization of this system is destructed by the quantized delay causing these two channels to occur delay change respectively at different times, here, so-called synchronization denotes the change of the delay index K occurs at the similar time point, the focusing term and the steering term are quantized as the following equation:

$$k_n' = round(\frac{x_i^2 \cos^2\theta}{nc^2 t_s^2}) \pm round(\frac{|x_i| \sin\theta}{ct_s}),$$

wherein "+" or "—" given to the two items in the equation is determined whether X value is plus or minus, as the shifting term has been quantized into an integer independently so that the time for change of delay index is only determined by the focusing item.

5.The control method of claim 1, wherein said synchronizing delay characteristic is utilized to design a single bit output

without adding extra noise, two values with equal absolute value but opposite signs are respectively inserted into said two corresponding channels, i.e. inserting “+1” in one channel, while inserting “-1” in the other channel such that one half side of the probe is always inserted with “+1”, while the other half side id always inserted”-1” so that the delay control logic is completely identical for said two symmetric channels, hence, a probe with N passages requires only M/2 delay control logic circuit.